WHAT IS CLAIMED IS:

Sub A2

1. A semiconductor light-emitting device comprising:

a substrate provided with an n-type lower electrode on the back surface;

a light-emitting layer provided on said substrate;

a p-type semiconductor layer provided on said light-emitting layer; and

an upper electrode provided on said p-type semiconductor layer, wherein

said upper electrode has a multilayer structure consisting of at least two heterogeneous layers.

2. The semiconductor light-emitting device according to claim 1, wherein said upper electrode includes an Au thin film coming into contact with said p-type semiconductor layer and an n-type transparent conductor film formed on said Au thin film.

3. The semiconductor light-emitting device according to claim 2, wherein the thickness of said Au thin film is 1nm to 3 nm.

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4. The semiconductor light-emitting device according to claim 2, wherein said transparent conductor film is made of In_2O_3–10 wt.% ZnO.

5. The semiconductor light-emitting device according to claim 1, wherein said upper electrode has a multilayer structure including an upper layer and a lower layer,

the surface of said upper layer is flattened, and

the surface of said upper layer is irregularized.

6. The semiconductor light-emitting device according to claim 1, wherein said substrate includes a ZnSe single-crystalline substrate, and

said p-type semiconductor layer includes a ZnSe semiconductor layer,

a ZnTe semiconductor layer or a BeTe semiconductor layer.

7. The semiconductor light-emitting device according to claim 4, wherein said transparent conductor film of In_2O_3–10 wt.% ZnO is formed by laser ablation.

8. A method of manufacturing a transparent conductor film comprising steps of:

placing a substrate in a vacuum chamber;

centering a target serving as the material for a transparent conductor film in said vacuum chamber;

introducing oxygen into said vacuum chamber; and

irradiating said target with a laser beam, depositing atoms or molecular ions emitted by ablation on said substrate and crystal-growing said atoms or molecular ions while oxidizing said atoms or molecular ions.

9. The method of manufacturing a transparent conductor film according to claim 8, wherein said target contains In_2O_3–10 wt.% ZnO.

10. The method of manufacturing a transparent conductor film according to claim 9, performing said crystal growth while controlling the film forming temperature in the range of the room temperature to 300°C.

11. The method of manufacturing a transparent conductor film according to claim 8, performing said crystal growth while setting the film forming pressure at 0.3 to 3 × 10^{-3} Torr.

12. A method of manufacturing a compound semiconductor light-emitting device comprising steps of:

preparing a compound semiconductor light-emitting device substrate immediately before formation of a transparent electrode;

placing said compound semiconductor light-emitting device substrate in a vacuum chamber;

centering a target serving as the material for a transparent conductor film in said vacuum chamber;

introducing oxygen into said vacuum chamber; and

irradiating said target with a laser beam, depositing atoms or molecular ions emitted by ablation on said compound semiconductor light-emitting device substrate and crystal-growing said transparent electrode while oxidizing said atoms or molecular ions.

13. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, wherein said target contains In_2O_3–10 wt.% ZnO.

14. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, performing said crystal growth while setting the film forming temperature ~~in~~ the range of the room temperature to 300°C.

15. The method of manufacturing a compound semiconductor light-emitting device according to claim 12, performing said crystal growth while setting the film forming pressure at 0.3 to 3×10^{-3} Torr.

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